Disaster in South-East of Iran: Saravan Earthquake with Minimum Mortality

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Abstract

The aim of the present article is to analyze the current state of Saravan city after the earthquake in 1392 and to examine the potential of the city against crises. The city is on the Saravan fault, the beginning of which is the western border of Pakistan that connects to the Zahedan fault. The city was hit with a 7.5-magnitude earthquake on Tuesday, April 16, 2013 at 3:14 PM. The number of injuries was low, and most of the earthquake victims needed quick treatments; therefore, there was no need for establishing a transportation corridor in order to evacuate the injured. What appears to be important is that the earthquake discussed in the present article may be misleading; Saravan is located in a lowly populated area of the south-east part of Iran, and unlike Varzaghan, Ahar, and Haris, most construction buildings in Saravan are one-story, worn-out, brick buildings of destructible, light structure. It is important to be wary that a similar incident in another part of the country will inflict more damage and casualties. *(JAEM 2014; 13: 216-8)*

Key words: Earthquake, casualty, disaster, city structure

Introduction

Iran is one of the disaster-prone countries in the world due to its extent, geographical position, and its weather variety and is in danger of natural hazards and man-made disasters (1, 2). According to a report released by the WHO in 2008, in the last 100 years, about 181 extreme disasters have happened in Iran, which led to 160,000 deaths, morbidity of more than 170,000, and injury of more than 44 million (3). According to the global assessment report on Disaster Risk Reduction published in 2009, Iran's disaster risk was estimated to be 8 out of 10 (2). Earthquakes, floods, and droughts are among the most prevalent disasters in Iran. Approximately 90% of regions in Iran are exposed to the dangers of earthquakes and floods (4). Over the past decade, 4000 people were killed and 55,000 have been injured on average every year (3); therefore Iran is constantly affected by the aforementioned disasters. Every once in a while, a tragic disaster affects parts of the country and inflicts loss and damage.

Calamities affect human societies either directly (death and injury) or indirectly (destruction of infrastructure and services). Calamities destroy infrastructure and disrupt the everyday flow of life, while its unfortunate consequences, such as casualties, wounds, disablement, and destruction of social establishments, leave many people in dire need of medical offerings and sudden demand of healthcare services (4, 5).

The aim of the present article is to analyze the current state of Saravan city after the earthquake in 1392 and to examine the potential of the city against crises.

Methodology

Geographical Position

Saravan is a city in the south-eastern part of Sistan and Baluchestan province in the east of Iran, with the following coordinates: 27.3708° N, 62.3342° E.

The city is 352 kilometers from the center of the province and 1450 meters above sea level.

Saravan is in the neighborhood of Khash city from the north, Iranshahr township from the west, Sarbaz township from the south, and Pakistan from the east.

Human Conditions

According to statistics acquired in November of 2011, Saravan had an urban population of 89,191 people and a rural population of 85,731 people, divided into 19,423 urban households and 19,827 rural households.

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Received: 21.01.2014 **Accepted:** 12.02.2014

DOI: 10.5152/jaem.2014.02418

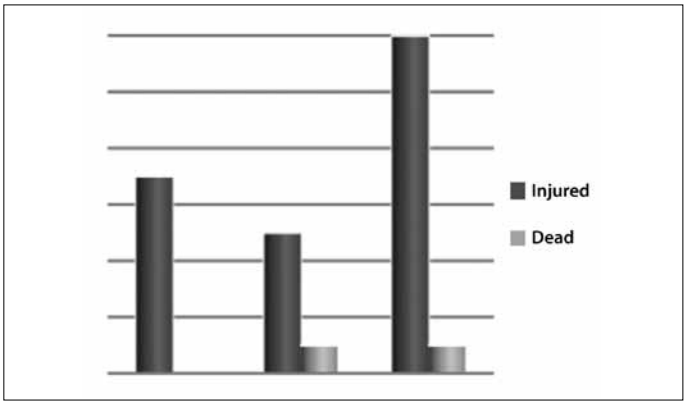

Chart 1. Number of casualties by gender

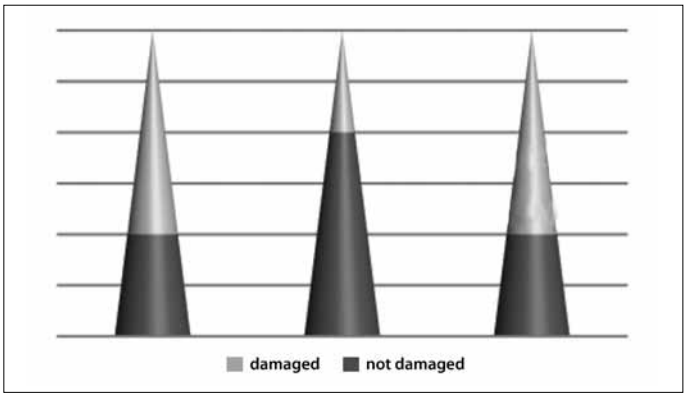

Chart 2. Damage to the texture based on different areas (%)

The weather conditions of the city are relatively hot, and the necessary water for farming is provided through two aqueducts. The main professions of the citizens of Saravan are farming and animal husbandry.

Tectonics

In April 16, 2013 a 7.5-magnitude earthquake hit Saravan. This was the worst and largest earthquake in Saravan in the past 100 years. According to the Earthquake Code 2800, Iran is located in a level 2danger zone, which translates into "highly dangerous."

The city is on the Saravan fault, the beginning of which is the western border of Pakistan, which connects to the Zahedan fault.

Results

Saravan, a city in the south-east of Sistan and Baluchestan province, is located along the border of Pakistan. The city was hit with a 7.5-magnitude earthquake on Tuesday, April 16, 2013 at 3:14 PM. This was one of the largest earthquakes of its kind in the region and the world. Such an earthquake was unprecedented in Saravan in the past 100 years. Compared to the 6.2-magnitude earthquake that hit Varzaghan, Ahar, and Haris cities on August 11, 2011 with a death toll of 306 people, the Saravan earthquake must inflict more casualties, because the increase in magnitude of the earthquake was logarithmic, while for every Richter, the magnitude was multiplied 33 times. Within an hour after the accident, the disaster room of Zahedan University of Medical Sciences was formed. During the disaster, early assessments were made. Because of the low extent of damage, only a few medical teams were dispatched to the earthquake location. Neighboring provinces and townships were in a state of alert. The early reports of news agencies indicated a death of 1 and injury of 12 in total. All casualties were taken to the hospital by ambulance, only 2 of whom needed spinal fixation, and the rest needed dressing for minor wounds and scars.

The number of injuries was low, and most of the earthquake victims needed quick treatments; therefore, there was no need for establishing a transportation corridor in order to evacuate the injured.

Damage to all buildings (residential, schools, and hospitals about 2%, offices 1%) was almost equal, but residential areas sustained more financial loss.

In the rural texture, of all 421 villages around Saravan, Gasht, and Khash, which were the epicenter of the earthquake, only 5 villages sustained minor loss, and only 2 were injured and taken to the hospital. The rest of the injured were treated at the location of the accident.

The hospitals in the aforementioned areas were fully active and accountable.

Discussion

Healthcare service is the main element of human survival through natural disasters (3). Hospitals, as the most pivotal providers of healthcare services, are the first and most important organizations to provide medical services (6, 7) on the occasion of the occurrence of calamities. It is extremely crucial and decisive that hospitals act immediately and effectively in time of calamities in order to reduce the number of casualties (6-8). The evidence clearly shows that the immediacy and responsiveness of hospitals result in a staggering reduction of the death toll (3).

According to the Iranian code of seismic-resistant design of buildings standard number 2800, Iran is one of the high-risk zones for earthquakes; however, the reason behind the low number of casualties should not be sought in the strength level of construction or the education of medical and paramedical squads and people of Saravan-geographic and urban locations should be taken into account as well, because these regions have low population density. Furthermore, the time of the occurrence of the earthquake is another effective factor, since the occupation of most natives of Saravan is farming, and they spend most of their time in farms and open spaces (9).

More attention has been paid to the responsiveness of hospitals to calamities in the country in recent years, and many measures have been taken in this regard, but the lack of experience, particularly real-world experience in reacting to calamities in Iranian hospitals, has been an obstacle.

The texture and population density of Saravan mostly consist of one-story buildings, and low-rise construction normally sustains less damage from the vibrations of earthquakes. Saravan is full of worn-out brick houses, all of which must undergo a technical examination after the earthquake. Such construction may appear to be fine and intact, but they might have become so worn out that they may collapse with very slight tectonic movements. Such an accident was seen in the Van earthquake in Turkey, where reporters and quake victims were settled. Unfortunately, Saravan lacks healthcare services and search and rescue teams. Hospitals in Khash, Saravan, Iranshahr, and Zahedan and "EMS" emergency centers are the only medical places close to the area of earthquake. Due to the total alertness of Zahedan University, a disaster room was formed within 1 hour after the occur-

rence of the earthquake, and early examinations were made in the critical period. Because of the low extent of damage, only a few medical teams were dispatched to the earthquake location. Neighboring provinces and townships were in a state of alert.

Saravan can be called a city-village due to the low population density and its particular rural-urban texture; consequently, the number of casualties was low, and most victims were treated quickly.

The 6.2- and 6.3-magnitude earthquakes that hit the townships of Haris, Varzaghan, and Ahar and shook parts of Azerbaijan Sharghi province resulted in the death of 306 (228 according to some sources) and 3000 casualties (10). In order to offer medical services, Bagher-al-Olum Hospital of Ahar admitted the injured, although the hospital building was damaged, and one of its floors was evacuated. A number of hospitals in Tabriz also admitted victims and practically experienced the situation of disaster response. Such occasions, although unfortunate, improve the disaster response of hospitals. Consequently, the incumbents of the present study intend to analyze the responsiveness and difficulties of hospitals scientifically. It is expected that the documentation of such experiences improve the responsiveness of other hospitals and ultimately result in the reduction of casualties.

Conclusion

What appears to be important is that the earthquake discussed in the present article may be misleading; Saravan is located in a lowly populated area of the south-east part of Iran, and unlike Varzaghan, Ahar, and Haris, most construction buildings in Saravan are one-story, worn-out, brick buildings of destructible, light structure. It is important to be wary that a similar incident in another part of the country will inflict more damage and casualties. The state of disaster management and immediate assistance, as well as the management of construction, is presently in good condition, because if such an earthquake occurs in populated regions of the northern and north-western parts of Iran, we will witness a national and humanitarian disaster. Therefore, the provision of technical, medical, and assistance infrastructure and macro-management in disaster are necessary for having healthy and resistant cities. It is important to keep in mind that preventing huge humanitarian disasters in big cities is possible if the technical and urbanization requirements for infrastructure are met.

Peer-review: Internally reviewed.

Author Contributions: Concept - A.S.V.; Design - S.S.V.; Supervision - C.G.; Materials - M.T.T.; Data Collection and/or Processing - M.T.T.; Analysis and/or Interpretation - S.S.V.; Literature Review - A.S.V.; Writer - T.M.; Critical Review - C.G.

Conflict of Interest: The authors declared no conflict of interest.

Financial Disclosure: The authors declared that this study has received no financial support.

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